AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application.

1. (Previously Presented) A continuous method for preparing acoustical panel comprising:

forming a mixture comprising water and calcined gypsum;

adding foaming agent to the aqueous calcined gypsum mixture;

casting the mixture in a continuous ribbon;

maintaining the ribbon under conditions sufficient for the calcined gypsum to form an interlocking matrix of set gypsum;

cutting the ribbon to form wet acoustical panel precursor; and

drying the wet panel precursor to form acoustical panel, wherein acoustical panel has a Normal Incident Sound Absorption of at least about 0.32, according to a modified ASTM E 1050-98.

2. (Original) The method of claim 1, wherein the mixture comprises cellulosic fiber.

3. (Original) The method of claim 2, wherein the cellulosic fiber is paper fiber.

4. (Original) The method of claim 2, wherein the amount of cellulosic fiber is from about 1% to about 12% by weight of the solids content in the mixture.

5. (Original) The method of claim 2, wherein the cellulosic fiber has an average fiber length of less than about 2 mm.

6. (Original) The method of claim 1, wherein the mixture comprises lightweight aggregate.

7. (Original) The method of claim 6, wherein the lightweight aggregate is expanded polystyrene.

8. (Original) The method of claim 6, wherein the lightweight aggregate has an average particle size of from about 0.5 mm to about 5 mm.

9. (Original) The method of claim 6, wherein the lightweight aggregate has a bulk density of from about 0.2 lb/ft^3 to about 0.3 lb/ft^3.

10. (Original) The method of claim 6, wherein the amount of lightweight aggregate is from about 0.2% to about 35% by weight of the solids content in the mixture.

11. (Original) The method of claim 1, wherein the mixture comprises binder.

12. (Original) The method of claim 11, wherein the binder is selected from the group consisting of starch, latex, and combinations thereof.

13. (Original) The method of claim 12, wherein the latex is selected from the group consisting of an acrylic compound, polyvinyl acetate, styrene butadiene, and combinations thereof.

14. (Original) The method of claim 12, wherein the starch is migrating.

15. (Original) The method of claim 12, wherein the starch is non-migrating.

16. (Original) The method of claim 12, wherein the starch comprises a combination of migrating starch and non-migrating starch.

17. (Original) The method of claim 11, wherein the amount of binder is from about 0.5% to about 5% by weight of the solids content in the mixture.

18. (Original) The method of claim 1, wherein the mixture is substantially free of mineral wool.

19. (Original) The method of claim 1, wherein a face sheet is applied on the mixture.

20. (Original) The method of claim 1, wherein the amount of calcined gypsum is from about 50% to about 95% by weight of the solids content of the mixture.

21. (Original) The method of claim 1, wherein the mixture comprises water reducing agent.

22. (Original) The method of claim 21, wherein the water reducing agent is selected from the group consisting of naphthalene sulfonates, polycarboxylate compounds, melamine compounds, and combinations thereof.

23. (Original) The method of claim 21, wherein the amount of water reducing agent is from about 0.2% to about 1.5% by weight of the solids content in the mixture.

24. (Currently Amended) The method of claim 1, wherein the foaming agent forms ~~foam void open cell~~ an open cell structure in the acoustical panel.

25. (Original) The method of claim 24, wherein the foaming agent is characterized by the formula

$$[CH_3(CH_2)_XCH_2(OCH_2CH_2)_YOSO_3] \ominus M+$$

wherein X is a number from 2 to 20, Y is a number from 0 to 10 and is greater than 0 in at least 50 weight percent of the foaming agent, and M is a cation, and combinations thereof.

26. (Original) The method of claim 24, wherein the amount of foaming agent used in forming the mixture is from about 0.005% to about 0.4% by weight of the solids content of the mixture.

27. (Original) The method of claim 1, wherein the mixture comprises an accelerator.

28. (Original) The method of claim 27, wherein the accelerator comprises calcium sulfate dihydrate.

29. (Original) The method of claim 27, wherein the amount of accelerator used in forming the mixture is from about 1% to about 15% by weight of the solids content of the mixture.

30. (Original) The method of claim 1, wherein the mixture comprises an enhancing material selected from the group consisting of an ammonium polyphosphate having 500-3000 repeating phosphate units, a trimetaphosphate compound, a tetrametaphosphate compound, a hexametaphosphate compound, and combinations thereof.

31. (Original) The method of claim 30, wherein the enhancing material is sodium trimetaphosphate.

32. (Original) The method of claim 30, wherein the amount of enhancing material is from about 0.004% to about 2% by weight of the solids content of the mixture.

33. (Original) The method of claim 1, wherein the ribbon before drying has a maximum density of about 53 lb/ft^3.

34. (Original) The method of claim 1, wherein the weight ratio of water to calcined gypsum in the mixture is from about 0.5:1 to about 1.5:1.

35. (Original) The method of claim 1, further comprising applying a forming plate or forming rollers to the mixture as it is cast in the continuous ribbon.

36. (Original) The method of claim 35, wherein the forming plate is a fluidization membrane.

37. (Original) The method of claim 35, wherein the forming plate is a vibrating plate.

38. (Original) The method of claim 1, wherein the mixture is cast directly or indirectly onto a backing sheet.

39. (Original) The method of claim 38, wherein the mixture for forming the acoustical layer is cast directly on the backing sheet.

40. (Original) The method of claim 38, wherein the backing sheet is formed from a material selected from the group consisting of non-woven glass face, metallic foil, paper, a laminate comprising paper and a metallic foil, and combinations thereof.

41. (Original) The method of claim 38, further comprising applying a densified layer precursor, comprising calcined gypsum and water, on the backing sheet.

42. (Original) The method of claim 41, wherein the densified layer, when cured, has a density of at least about 35 lbs/ft^3.

43. (Original) The method of claim 41, further comprising applying a scrim layer on the densified layer.

44. (Original) The method of claim 43, wherein the scrim layer is selected from the group consisting of paper, non-woven fiberglass, woven fiberglass, synthetic fiber, and combinations thereof.

45. (Original) A continuous method for preparing acoustical panel comprising:

providing a backing sheet;

forming a first mixture comprising (a) water, (b) calcined gypsum, and (c) foaming agent, and optionally one or more of the following: (d) cellulosic fiber, (e) lightweight aggregate, (f) binder, (g) accelerator, (h) water reducing agent, and (i) enhancing material selected from the group consisting of an ammonium polyphosphate having 500-3000 repeating phosphate units, a trimetaphosphate compound, a tetrametaphosphate compound, a hexametaphosphate compound, and combinations thereof;

forming a second mixture comprising (a) water, and (b) calcined gypsum, and optionally one or more of the following ingredients: (c) cellulosic fiber, (d) lightweight aggregate, (e) binder, (f) accelerator, (g) water reducing agent, and (h) an enhancing material

selected from the group consisting of an ammonium polyphosphate having 500-3000 repeating phosphate units, a trimetaphosphate compound, a tetrametaphosphate compound, a hexametaphosphate compound, and combinations thereof;

casting the second mixture onto the backing sheet to form a densified layer precursor;

casting the first mixture as an acoustical layer precursor onto the densified layer precursor to form a continuous ribbon;

maintaining the ribbon under conditions sufficient for the calcined gypsum in each of the densified layer precursor and the acoustical layer precursor to form an interlocking matrix of set gypsum;

cutting the ribbon to form wet acoustical panel precursor; and

drying the wet panel precursor to form the acoustical panel, wherein the acoustical panel has a Normal Incident Sound Absorption of at least about 0.32, according to a modified ASTM E 1050-98.

46. (Original) The method of claim 45, further comprising applying a scrim layer onto the densified layer precursor.

47. (Original) The method of claim 46, wherein the scrim layer is selected from the group consisting of paper, non-woven fiberglass, woven fiberglass, synthetic fiber, and combinations thereof.

48. (Original) The method of claim 45, wherein the first mixture comprises:

(a) from about 50% to about 150% water;

(b) from about 50% to about 95% calcined gypsum;

(c) from about 1% to about 12% cellulosic fiber;

(d) from about 0.2% to about 35% lightweight aggregate;

(e) from about 0.5% to about 5% binder;

(f) from about 0.005% to about 0.4% foaming agent;

(g) from about 1% to about 15% accelerator;

(h) from about 0.2% to about 1.5% water reducing agent; and

(i) from about 0.004% to about 2% enhancing material, wherein the foregoing amounts are by weight of the solids content in the mixture.

49. (Original) The method of claim 45, wherein the cellulosic fiber is paper fiber and the lightweight aggregate is expanded polystyrene.

50. (Original) The method of claim 45, wherein the second mixture further comprises foaming agent, the method further comprising beating the second mixture to minimize formation of foam voids.

51-95. (Canceled)

96. (Previously Presented) The method of claim 1, wherein the acoustical panel has a density of from about 12 lb/ft^3 to about 20 lb/ft^3.

97. (Previously Presented) The method of claim 96, wherein the mixture comprises cellulosic fiber.

98. (Previously Presented) The method of claim 97, wherein the cellulosic fiber is paper fiber.

99. (Previously Presented) The method of claim 97, wherein the amount of cellulosic fiber is from about 1% to about 12% by weight of the solids content in the mixture.

100. (Previously Presented) The method of claim 97, wherein the cellulosic fiber has an average fiber length of less than about 2 mm.

101. (Previously Presented) The method of claim 96, wherein the mixture comprises lightweight aggregate.

102. (Previously Presented) The method of claim 101, wherein the lightweight aggregate is expanded polystyrene.

103. (Previously Presented) The method of claim 101, wherein the lightweight aggregate has an average particle size of from about 0.5 mm to about 5 mm.

104. (Previously Presented) The method of claim 101, wherein the lightweight aggregate has a bulk density of from about 0.2 lb/ft^3 to about 0.3 lb/ft^3.

105. (Previously Presented) The method of claim 101, wherein the amount of lightweight aggregate is from about 0.2% to about 35% by weight of the solids content in the mixture.

106. (Previously Presented) The method of claim 96, wherein the weight ratio of water to calcined gypsum in the mixture is from about 0.5:1 to about 1.5:1.

107. (Previously Presented) The method of claim 1, wherein the mixture comprises cellulosic fiber and lightweight aggregate.

108. (Previously Presented) The method of claim 107, wherein the cellulosic fiber is paper fiber.

109. (Previously Presented) The method of claim 107, wherein the cellulosic fiber has an average fiber length of less than about 2 mm.

110. (Previously Presented) The method of claim 107, wherein the lightweight aggregate is expanded polystyrene.

111. (Previously Presented) The method of claim 107, wherein the lightweight aggregate has an average particle size of from about 0.5 mm to about 5 mm.

112. (Previously Presented) The method of claim 107, wherein the weight ratio of water to calcined gypsum in the mixture is from about 0.5:1 to about 1.5:1.

113. (Previously Presented) The method of claim 45, wherein the first mixture comprises (a) water, (b) calcined gypsum, (c) foaming agent, (d) cellulosic fiber, and (e) lightweight aggregate.

114. (Previously Presented) The method of claim 113, wherein the cellulosic fiber is paper fiber.

115. (Previously Presented) The method of claim 113, wherein the amount of cellulosic fiber is from about 1% to about 12% by weight of the solids content in the first mixture.

116. (Previously Presented) The method of claim 113, wherein the cellulosic fiber has an average fiber length of less than about 2 mm.

117. (Previously Presented) The method of claim 113, wherein the lightweight aggregate is expanded polystyrene.

118. (Previously Presented) The method of claim 113, wherein the lightweight aggregate has an average particle size of from about 0.5 mm to about 5 mm.

119. (Previously Presented) The method of claim 113, wherein the lightweight aggregate has a bulk density of from about 0.2 lb/ft^3 to about 0.3 lb/ft^3.

120. (Previously Presented) The method of claim 113, wherein the amount of lightweight aggregate is from about 0.2% to about 35% by weight of the solids content in the mixture.

121. (Previously Presented) The method of claim 113, wherein the weight ratio of water to calcined gypsum in the mixture is from about 0.5:1 to about 1.5:1.

122. (Previously Presented) The method of claim 45, wherein the acoustical panel has a density of from about 12 lb/ft^3 to about 20 lb/ft^3.

123. (New) A continuous method for preparing acoustical panel comprising:

(i) forming a mixture comprising

(a) water,

(b) calcined gypsum, and

(c) cellulosic fiber;

(ii) adding foaming agent in the form of a pregenerated foam to the aqueous calcined gypsum mixture;

(iii) casting the mixture in a continuous ribbon;

(iv) maintaining the ribbon under conditions sufficient for the calcined gypsum to form an interlocking matrix of set gypsum;

(v) cutting the ribbon to form wet acoustical panel precursor; and

(vi) drying the wet panel precursor to form acoustical panel;

wherein acoustical panel has a density of from about 10 lb/ft^3 to about 25 lb/ft^3 and an open cell structure sufficient to give rise to a Normal Incident Sound Absorption of at least about 0.32 according to a modified ASTM E 1050-98.

124. (New) The method of claim 123, wherein the cellulosic fiber is paper fiber.

125. (New) The method of claim 123, wherein the amount of cellulosic fiber is from about 1% to about 12% by weight of the solids content in the mixture.

126. (New) The method of claim 123, wherein the cellulosic fiber has an average fiber length of less than about 2 mm.

127. (New) The method of claim 123, wherein the mixture comprises expanded polystyrene lightweight aggregate having an average particle size of from about 0.5 mm to about 5 mm.

128. (New) The method of claim 123, wherein the mixture comprises binder selected from the group consisting of starch, latex, and combinations thereof.

129. (New) The method of claim 123, wherein the mixture is substantially free of mineral wool.

130. (New) The method of claim 123, wherein the amount of calcined gypsum is from about 50% to about 95% by weight of the solids content of the mixture.

131. (New) The method of claim 123, wherein the mixture comprises water reducing agent selected from the group consisting of naphthalene sulfonates, polycarboxylate compounds, melamine compounds, and combinations thereof.

132. (New) The method of claim 123, wherein the amount of foaming agent used in forming the mixture is from about 0.005% to about 0.4% by weight of the solids content of the mixture.

133. (New) The method of claim 123, wherein the mixture comprises a calcium sulfate dihydrate accelerator.

134. (New) The method of claim 123, wherein the mixture comprises an enhancing material selected from the group consisting of an ammonium polyphosphate having 500-3000 repeating phosphate units, a trimetaphosphate compound, a tetrametaphosphate compound, a hexametaphosphate compound, and combinations thereof.

135. (New) The method of claim 123, wherein the weight ratio of water to calcined gypsum in the mixture is from about 0.5:1 to about 1.5:1.

136. (New) The method of claim 123, wherein the mixture for forming the acoustical layer is cast directly onto a backing sheet.

137. (New) The method of claim 136, further comprising applying a densified layer precursor, comprising calcined gypsum and water, on the backing sheet.

138. (New) A continuous method for preparing acoustical panel comprising:

(i) forming a mixture comprising

(a) water,

(b) calcined gypsum, and

(c) about 1% to about 12% by weight of the solids content in the mixture cellulosic fiber having an average fiber length of less than about 2 mm;

(ii) adding foaming agent to the aqueous calcined gypsum mixture;

(iii) casting the mixture in a continuous ribbon;

(iv) maintaining the ribbon under conditions sufficient for the calcined gypsum to form an interlocking matrix of set gypsum;

(v) cutting the ribbon to form wet acoustical panel precursor; and

(vi) drying the wet panel precursor to form acoustical panel;

wherein acoustical panel has a Normal Incident Sound Absorption of at least about 0.32 according to a modified ASTM E 1050-98.

139. (New) The method of claim 138, wherein the cellulosic fiber is paper fiber.

140. (New) The method of claim 138, wherein the mixture comprises expanded polystyrene lightweight aggregate having an average particle size of from about 0.5 mm to about 5 mm.

141. (New) The method of claim 138, wherein the mixture comprises binder selected from the group consisting of starch, latex, and combinations thereof.

142. (New) The method of claim 138, wherein the mixture is substantially free of mineral wool.

143. (New) The method of claim 138, wherein the amount of calcined gypsum is from about 50% to about 95% by weight of the solids content of the mixture.

144. (New) The method of claim 138, wherein the mixture comprises water reducing agent selected from the group consisting of naphthalene sulfonates, polycarboxylate compounds, melamine compounds, and combinations thereof.

145. (New) The method of claim 138, wherein the amount of foaming agent used in forming the mixture is from about 0.005% to about 0.4% by weight of the solids content of the mixture.

146. (New) The method of claim 138, wherein the mixture comprises a calcium sulfate dihydrate accelerator.

147. (New) The method of claim 138, wherein the mixture comprises an enhancing material selected from the group consisting of an ammonium polyphosphate having 500-3000 repeating phosphate units, a trimetaphosphate compound, a tetrametaphosphate compound, a hexametaphosphate compound, and combinations thereof.

148. (New) The method of claim 138, wherein the weight ratio of water to calcined gypsum in the mixture is from about 0.5:1 to about 1.5:1.

149. (New) The method of claim 138, wherein the mixture for forming the acoustical layer is cast directly onto a backing sheet.

150. (New) The method of claim 149, further comprising applying a densified layer precursor, comprising calcined gypsum and water, on the backing sheet.

151. (New) A continuous method for preparing acoustical panel comprising:

(i) forming a mixture comprising

(a) water,

(b) calcined gypsum, and

(c) about 1% to about 12% by weight of the solids content in the mixture cellulosic fiber;

(ii) adding foaming agent in the form of a pregenerated foam to the aqueous calcined gypsum mixture;

(iii) casting the mixture in a continuous ribbon;

(iv) maintaining the ribbon under conditions sufficient for the calcined gypsum to form an interlocking matrix of set gypsum;

(v) cutting the ribbon to form wet acoustical panel precursor; and

(vi) drying the wet panel precursor to form acoustical panel;

wherein acoustical panel has a density of from about 10 lb/ft^3 to about 25 lb/ft^3 and an open cell structure sufficient to give rise to a Normal Incident Sound Absorption of at least about 0.32 according to a modified ASTM E 1050-98.

152. (New) The method of claim 151, wherein the cellulosic fiber is paper fiber.

153. (New) The method of claim 151, wherein the mixture comprises expanded polystyrene lightweight aggregate having an average particle size of from about 0.5 mm to about 5 mm.

154. (New) The method of claim 151, wherein the mixture comprises binder selected from the group consisting of starch, latex, and combinations thereof.

155. (New) The method of claim 151, wherein the mixture is substantially free of mineral wool.

156. (New) The method of claim 151, wherein the amount of calcined gypsum is from about 50% to about 95% by weight of the solids content of the mixture.

157. (New) The method of claim 151, wherein the mixture comprises water reducing agent selected from the group consisting of naphthalene sulfonates, polycarboxylate compounds, melamine compounds, and combinations thereof.

158. (New) The method of claim 151, wherein the amount of foaming agent used in forming the mixture is from about 0.005% to about 0.4% by weight of the solids content of the mixture.

159. (New) The method of claim 151, wherein the mixture comprises a calcium sulfate dihydrate accelerator.

160. (New) The method of claim 151, wherein the mixture comprises an enhancing material selected from the group consisting of an ammonium polyphosphate having 500-3000 repeating phosphate units, a trimetaphosphate compound, a tetrametaphosphate compound, a hexametaphosphate compound, and combinations thereof.

161. (New) The method of claim 151, wherein the weight ratio of water to calcined gypsum in the mixture is from about 0.5:1 to about 1.5:1.

162. (New) The method of claim 151, wherein the mixture for forming the acoustical layer is cast directly onto a backing sheet.

163. (New) The method of claim 162, further comprising applying a densified layer precursor, comprising calcined gypsum and water, on the backing sheet.